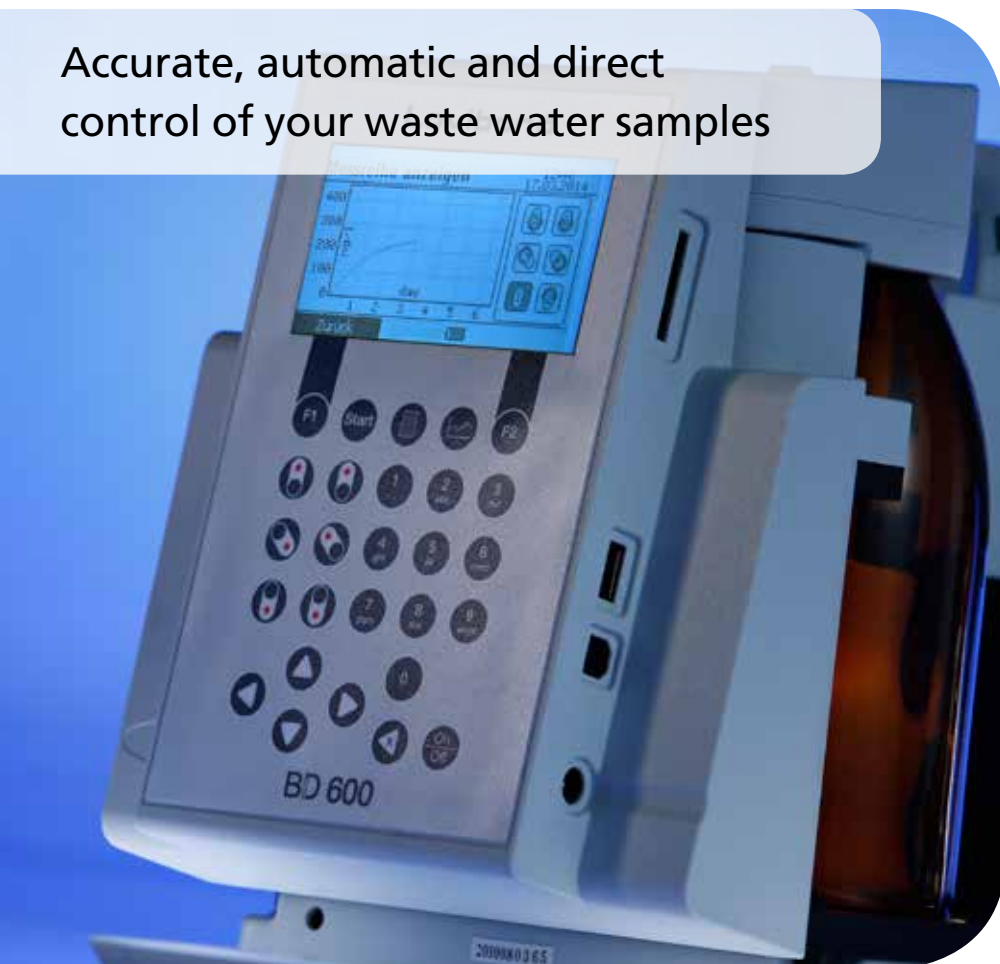


# BOD Measurement System BD 600

Accurate, automatic and direct control of your waste water samples



## Highlights

- User friendly
- Large bright graphic display
- Graphical representation of measured values
- USB & SD Card interface
- Mercury-free, environmentally-friendly
- Remote control
- User-selectable time span from 1 to 28 days
- Free individual programming of each of the six samples
- Inductive stirring system, 110 - 240 V / 50 - 60 Hz

## Applications

- Waste Water
- Determination of Biological Activity
- Waste Water Treatment Plants
- Analytical Laboratories
- Science & Research

## References

- APHA, AWWA, WEF Standard Methods 5210 D
- H55 as a supplement to EN 1899-2

## Biochemical Oxygen Demand (BOD)

BOD – biochemical oxygen demand – is an expression for the quantity of oxygen required for biological degradation of organic matter in a waste water sample. BOD measurement is therefore used as a basis for the detection of biologically degradable organic matter in water. The difference between BOD and chemical oxygen demand (COD) is that COD additionally registers biologically non-degradable organic matter.

BOD measurement is therefore an important measurement of the effects of domestic and industrial waste water on sewage plants and outflow points.

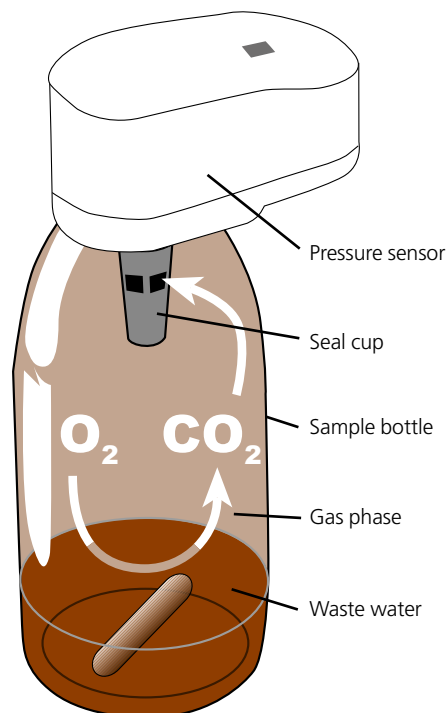
### Manometric, respirometric BOD measurement using the Lovibond® BD 600

The Lovibond® sensor system BD 600 is a 6 sample system that allows precise measurements of BOD based on the manometric principle. Manometric respirometers relate oxygen uptake to the change in pressure caused by oxygen consumption while maintaining a constant volume. Thanks to the modern integral pressure sensors, it is no longer necessary to use mercury for pressure measurements.

### Measuring ranges and sample volumes

The BOD level of a sample depends on the quantity of organic matter present, which can vary considerably. The Lovibond® BOD measuring system BD 600 is therefore calibrated for the various sample volumes and the corresponding measuring ranges listed in the table below. The overall measuring range of the system is 0 – 4000 mg/l.

For all measuring ranges, BOD is shown directly in mg/l.



Range mg / l BOD	Sample Volume ml
0 – 40	428
0 – 80	360
0 – 200	244
0 – 400	157
0 – 800	94
0 – 2000	56
0 – 4000	21.7

## BD 600 Principle

Respirometric methods provide direct measurements of the oxygen consumed by microorganisms from an air or oxygen-enriched environment in a closed vessel under conditions of constant temperature and agitation. Carbon dioxide produced metabolically by the bacteria is chemically bound by the potassium hydroxide solution contained in the seal cup in the bottle.

The result is a pressure drop in the system, which is directly proportional to the BOD value and is measured by the BOD sensor. The BOD level is then displayed directly in mg/l.

The BOD values are stored automatically in the sensor memory in regular intervals and can be called up on the large-format display at any time without the need for time-consuming conversion using factors. This means that test series that end on a Sunday can be evaluated during the following week without any problem. Measurement series can be stored on USB stick/SD card or transferred via USB cable to evaluate the data on a computer.

The measurement period is user-selectable between 1 and 28 days to suit the application. While short measurement periods are useful for scientific applications, standard BOD measurements typically extend over a period of 5 days – and manometric determination of OECD, for example, generally takes place over a period of 28 days.



### BD 600 GLP (OECD 301 F) optimized for biodegradability tests under GLP conditions

- Supports the requirements for GLP
- Suitable for BOD measurements and tests according to OECD 301F
- Protected, resident memory for all data over the lifetime of the device (1 GB)
- Long term tests of up to 90 days measurement duration possible
- Simplified data transfer to the PC via USB
- Graphical user interface

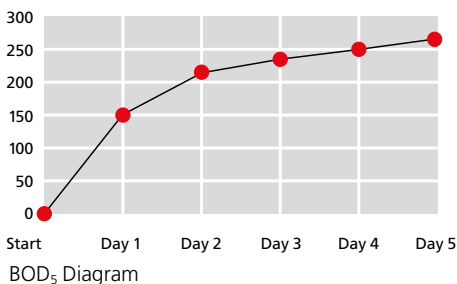
**Order code** 2 44 44 61

**New**

The REACH provisions stipulate that every chemical with a production volume of more than one tonne / year is registered and tested must become. These tests follow precise guidelines and procedures, which, among other things, examine the residence time of chemicals in the environment. Therefore, the demand for tests for the measurement of biodegradability according to OECD standard 301F is correspondingly high. While performing these tests need to Laboratories comply with GLP (Good Laboratory Practice) standards.

With the BD 600 GLP, we have developed a new system that combines modern design and up-to-date data exchange via USB with GLP-compliant data management and a lifetime of the device protected resident memory (1 GB). All settings and changes are registered and logged. Any manipulation is thus prevented, erasure of data impossible.

Day	Display
1. Day	150 mg/l
2. Day	220 mg/l
3. Day	240 mg/l
4. Day	250 mg/l
5. Day	260 mg/l



BOD accessories

## Evaluation of measurements

The BD 600 measuring system records a measurement once every hour, independent of the length of the measuring period. This way the quality of the series of measurement can be evaluated in an early stage. Current values and stored values may be called up at any time. Stored value can be displayed numerically or graphically. The table/graph on the left illustrates an example of BOD<sub>5</sub> evaluation. The development of BOD over a period of five days is easily seen.

## Automatic start function

Variations in sample temperature prior to testing result in pressure variations within the measuring system during the temperature equalisation period in the thermostatically controlled cabinet (if BOD measurement is to take place at 20°C, for example). Such variations would normally cause errors during manometric measurement. In order to prevent such errors, the Lovibond® BD 600 BOD meter is equipped with an automatic start feature: measurement does not commence until the temperature in the samples is the same as that in the thermostatically controlled cabinet. This rules out the possibility of temperature (and hence pressure) fluctuations that are not related to the manometric measurement.

## The complete BD 600 measuring system

In addition to the BOD unit for measurement and storage of BOD levels, the Lovibond® BD 600 BOD measuring system includes sample bottles, measuring sensors, non-wearing inductive stirring system, overflow measuring flasks for metering of sample volumes, nitrification inhibitor and potassium hydroxide as an absorbent.

## Technical data

<b>Meas. principle</b>	Manometric; mercury-free; electronic pressure sensor
<b>Ranges [mg/l O<sub>2</sub>]</b>	0 - 40, 0 - 80, 0 - 200, 0 - 400, 0 - 800, 0 - 2000, 0 - 4000 mg/l
<b>Applications</b>	BOD <sub>5</sub> , BOD <sub>7</sub> , OECD 301 F ...
<b>Display</b>	128 x 240 pixel, 45 x 84 mm, backlit
<b>Measurement period</b>	User-selectable, between 1 and 28 days
<b>Auto result storage</b>	Up to 744 results, depending on measurement period and amount of sample bottles
<b>Storage interval</b>	– hourly (1 day) – every 2 hours (2 days) – daily (3-28 days)
<b>Automatic start function</b>	– After temperature equalisation of samples – Can be switched off
<b>Power supply</b>	3 alkaline-manganese batteries ("Baby" cells/size "C") or via power supply unit using y-cable with stirring unit
<b>Interface</b>	USB host port (USB stick) USB device port (computer) SD card
<b>Clock</b>	Real-time clock
<b>Protection class</b>	IP 54 (sensor head)
<b>Dimensions (L x W x H)</b>	375 x 181 x 230 mm including stirring unit
<b>Weight</b>	4100 g, unit with bottles & batteries 5775 g, complete with stirring unit
<b>Approval</b>	CE

### Delivery Content BD 600

- BD 600, complete unit with 6 sensor heads and control unit with batteries
  - Power supply unit incl. Y-cable for common power supply of BD 600 and stirring unit
  - 1 x USB-cable
  - 1 x remote control
  - Inductive stirring unit
  - 6 sample bottles
  - 6 rubber gaskets
  - 6 magnetic stirring rods
  - 1 overflow flask, 157 ml
  - 1 overflow flask, 428 ml
  - 1 bottle, 50 ml potassium hydroxide solution
  - 1 bottle, 50 ml nitrification inhibitor solution
  - 1 instruction
- Order code: 2 44 44 60

### Delivery Content BD 606

- 2 x BD 600, complete unit each with 6 sensor heads and control unit with batteries
  - 2 x power supply unit incl. Y-cable for common power supply of BD 600 and stirring unit
  - 2 x USB-Cable
  - 1 x remote control
  - 2 x Inductive stirring unit
  - 12 sample bottles
  - 12 rubber gaskets
  - 12 magnetic stirring rods
  - 1 overflow flask, 157 ml
  - 1 overflow flask, 428 ml
  - 1 bottle, 50 ml potassium hydroxide solution
  - 1 bottle, 50 ml nitrification inhibitor solution
  - 1 instruction
- Order code: 2 44 44 65



Remote control

## Accessories

Item	Order code
<b>Sensor head</b>	2 44 44 70
<b>BOD sample bottle</b> Brown glass, 500 ml	41 86 44
<b>BOD sample bottles</b> , Brown glass, 500 ml, set of 6 bottles	41 86 45
<b>Inductive stirring system</b> for 6 samples, 100-240 V / 50-60 Hz, incl. power supply	2 44 44 56
<b>Power supply unit for inductive stirring system</b> , 100 - 240 V / 50 - 60 Hz	44 44 54
<b>Stirring rod</b>	41 86 33
<b>Stirring rod remover</b>	41 86 38
<b>Rubber gasket</b>	41 86 36
<b>Chemicals:</b>	
<b>Potassium hydroxide solution</b> 45 %, 50 ml	2 41 86 34
<b>Nitrification inhibitor (N-ATH)</b> 50 ml	2 41 86 42
<b>Overflow flask</b> , 21.7 ml	41 86 64
<b>Overflow flask</b> , 56 ml	41 86 55
<b>Overflow flask</b> , 94 ml	41 86 56
<b>Overflow flask</b> , 157 ml	41 86 57
<b>Overflow flask</b> , 244 ml	41 86 58
<b>Overflow flask</b> , 360 ml	41 86 59
<b>Overflow flask</b> , 428 ml	41 86 60
<b>Complete set overflow flasks</b>	41 86 54
<b>Test set</b> , BOD CM test tablets, box with 10 tablets	2 41 83 28
USB-cable, length 3 meter	2 44 44 82
Y-cable	2 44 44 75
Remote control	2 44 44 81

## Test set for BD 600

We also supply a test set to check for correct operation of the Lovibond® BD 600 BOD meter. The set contains 10 BOD CM1 test tablets that cause a defined oxygen consumption.

The tablets are easy to use. Simply place a tablet in the BOD bottle, start the measurement process, read off the BOD value after 5 days, and then compare with the defined value. If this value is within the quoted tolerance, this means that the BOD measuring system is functioning correctly.



BOD CM test tablets, order code: 2 41 83 28

## Temperature equalisation during BOD measurement

Temperature equalisation is essential prior to biological testing, as temperature has a major effect on biological activity. BOD measurements, for example, are always performed in a thermostatically controlled cabinet at a temperature of 20°C.

For temperature equalisation, we recommend Lovibond® thermostatically controlled cabinets with a user-selectable temperature from 2°C to 40°C.

## Inductive stirring system



Inductive stirring system

The microprocessor-controlled Lovibond® inductive stirring system is non-wearing and maintenance-free. In other words, there are no moving parts in the system.

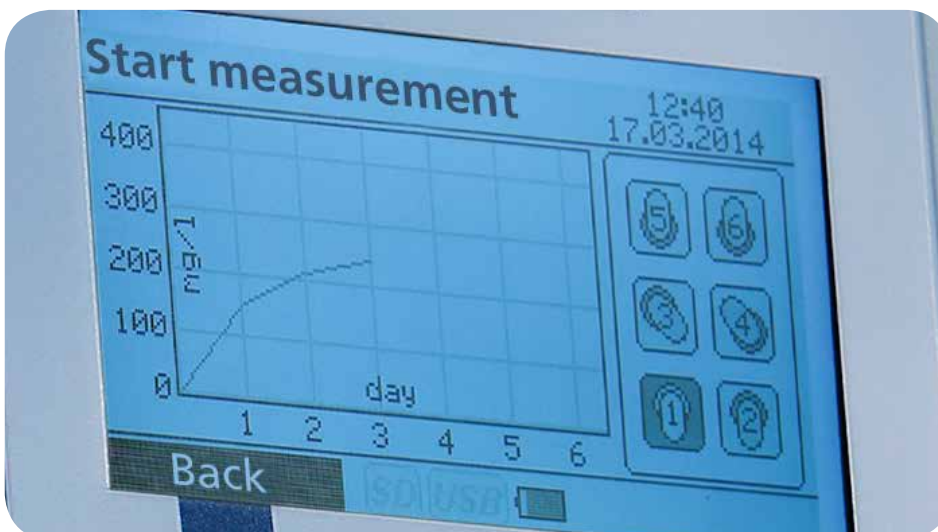
At regular intervals, the magnetic stirring rods are accelerated and slowed down again, taking them up to maximum speed and back down again. This ensures the centralization of the stirring rods.

Stirring rods that move away from the centre of the bottle are re-centered quickly and reliably.

The inductive actuation system guarantees maintenance-free operation (no need to replace drive belts or burnt-out drive motors) for many years.

## Highlights

- Maintenance-free and non-wearing
- Regular change in stirring speed
- Automatic centering of stirring rods
- No mechanical components in the stirring system



Graphical representation of measured values